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BOOK-REVIEWS.

Elliptic Functions. By ARTHUR L. BAKER. New York, Wiley. 8°. \$1.50.

THOSE who want to take up this somewhat complicated subject, and who have been repelled by the larger works of foreign writers, will be glad to get hold of Professor Baker's work, who is, by the way, the professor of mathematics in the Stevens School of the Stevens Institute of Technology, Hoboken, N.J., and who was formerly connected with the scientific department of Lafayette College, Easton, Penn.

Professor Baker does not pretend to have contributed anything to the methods of treatment, but he has aimed at smoothing the road to this increasingly important branch of mathematics, and of putting within reach of the English student a tolerably complete outline of the subject, clothed in simple mathematical language and methods.

The Principles of Psychology. By WILLIAM JAMES. 2 vols. (American Science Series, Advance Course.) New York, Holt. 8°.

IN the presence of two large and weighty volumes, embodying the slowly matured thoughts of an able and original thinker upon a subject teeming with new and fascinating problems but no less so with difficulties and pitfalls, the reviewer finds his task no ordinary one. He feels that he has before him a work destined to have considerable influence upon the progress of psychological science amongst us, and especially so because it appears at a time in the growth of the science which is particularly responsive to formative influences, and because it appeals to the advanced student, who has in some part acquired the fundamental facts, and is ready to form interpretations and opinions of his own,—a work for which the teacher of psychology will find a handy place on his book-shelf, and to which all those who in the future may attempt surveys of psychological science will make repeated and pertinent reference.

The attitude of the author to his subject is precisely that of the expert in any department of exact science to his chosen specialty. It is to psychology as a science—to scientific psychology—that Professor James contributes. "I have kept close to the point of view of natural science throughout the book. Every natural science assumes certain data uncritically, and declines to challenge the elements between which its own 'laws' obtain, and from which its own deductions are carried on. . . . This book, assuming that thoughts and feelings exist and are vehicles of knowledge, thereupon contends that Psychology, when she has ascertained the empirical correlation of the various sorts of thought or feeling with definite conditions of the brain, can go no farther—can go no farther, that is, as a natural science. If she goes farther, she becomes metaphysical." While psychology thus demands recognition as a distinct one of the sciences, it is equally desirous of keeping in intimate relationship with every other department of knowledge that can contribute to its completeness, or to which it may be useful. Especially in the present stage of rapid growth is it necessary to keep eyes and ears open to suggestions from any source, and to refrain from any narrow though ever so systematic definition of the province of psychology. Professor James's expression of this need, and defence of this position, are so admirable as to demand citation.

"The boundary-line of the mental is certainly vague. It is better not to be pedantic, but to let the science be as vague as the subject and include such phenomena as these, if by so doing we can throw any light on the main business in hand. It will ere long be seen, I trust, that we can, and that we gain much more by a broad than by a narrow conception of our subject. At a certain stage in the development of every science a degree of vagueness is what best consists with fertility. On the whole, few recent formulas have done more real service of a rough sort in psychology than the Spencerian one, that the essence of mental life and of bodily life are one, namely, 'the adjustment of inner to outer relations.' Such a formula is vagueness incarnate; but because it takes into account the fact that minds inhabit environments, which act on them, and on which they in turn re-act; because, in

short, it takes mind in the midst of all its concrete relations,—it is immensely more fertile than the old-fashioned 'rational psychology,' which treated the soul as a detached existent, sufficient unto itself, and assumed to consider only its nature and properties. I shall therefore feel free to make any sallies into zoölogy or into pure nerve-physiology which may seem instructive for our purposes, but otherwise shall leave those sciences to the physiologists."

While thus free to borrow from more mature sciences, psychology is not less free to develop its own methods and resources. Experimental psychology is not co extensive with scientific psychology: observation, hypothesis, comparison, and that much-abused introspection, have all equally worthy places. The mere mental fact means about as little as any other: the interpretation of it gives it life and a place in science. Such interpretation is frequently impossible except by the inner consultation of personal experience by introspection. The introspection that is dangerous, and upon which a justifiable odium has fallen is one that soars free of experience, takes no account of the peculiarities of the mind that is "introspected," and ends by forcing the facts into accord with a fanciful theory. The introspection that Professor James so cleverly employs is one that welcomes any possible corroboration or suggestion from experiment,—one that is made necessary by the inadequacy of the facts, and has for its end the accumulation of further knowledge.

Having thus indicated the spirit and methods of the work, we may proceed to examine its scope and subject-matter. This it is difficult to describe except by enumerating the titles of chapters. It is difficult to discover the guiding principle according to which one topic is treated fully, a second sparingly, and a third entirely ignored. Indeed, one derives the impression that this guiding principle is none other than the personal interests of the author. He has gathered together the various problems of which he has at various times made special study (and in part published the results), and added thereto certain other chapters allied to these in the way of introduction or corollary. It is not, and makes no pretence of being, a systematic work. The topics most liberally treated are such as the perception of space, perception of time, perception of "things," perception of reality, the stream of thought, association, attention, imagination, self-consciousness, the emotions, the will, necessary truths; though the more concrete problems of the functions of the brain, habit, discrimination and comparison, memory, instinct, hypnotism, are by no means slighted. The order of topics is also not the usual one. First are treated the complex mental operations as presented in the adult thinker; and then, as analysis shows the possibility of viewing these as elaborate instances of simpler abstract processes, the latter are more specifically studied.

The manner of treatment is everywhere attractive, and there are few dull pages in the book. There is a wealth of illustrative material gathered from a great variety of sources, and the descriptions of mental and emotional conditions are always bright and pertinent. As one instance of many, take the following description of the state of distraction, or "brown study": "The eyes are fixed on vacancy; the sounds of the world melt into confused unity; the attention is dispersed so that the whole body is felt, as it were, at once; and the foreground of consciousness is filled, if by any thing, by a sort of solemn sense of surrender to the empty passing of time. In the dim background of our mind we know, meanwhile, what we ought to be doing: getting up, dressing ourselves, answering the person who has spoken to us, trying to make the next step in our reasoning. But somehow we cannot start: the *pensée de derrière la tête* fails to pierce the shell of lethargy that wraps our state about. Every moment we expect the spell to break, for we know no reason why it should continue. But it does continue, pulse after pulse, and we float with it until—also without reason that we can discover—an energy is given, something—we know not what—enables us to gather ourselves together, we wink our eyes, we shake our heads, the background-ideas become effective, and the wheels of life go round again."

Finally, with regard to the practical value of the work. What is its place as a text-book? It certainly can hope for only a limited field. It takes for granted that knowledge which it is the purpose of most college courses in psychology to convey; and,